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## INFORMATION SOURCES ON TOURISM DEMAND: A COMPARISON.

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### INTRODUCTION.

The importance of tourism in a social and economic system, like the Italian one, generates extensive literature, with analyses, data, reports, proposals. The remarkable amount of information that is gathered and made available to different users (policy makers, scholars, operators, ...) forces us to pay more attention to those sources which are a guarantee of relevance and accuracy, for the interpretation of tourism. In this respect, the Italian National Statistics Institute (ISTAT) supplies adequate (even if not always timely) information on the characteristics and dynamics of demand and supply of tourist services.

ISTAT surveys on tourism, however, do not always supply direct information on its economic dimension; in fact, they refer to arrivals, overnight stays, the main characteristics of the trip, the characteristics of tourist facilities etc. but they do not directly investigate aspects concerning travellers' expenditures and commercial operators' proceeds. Moreover, it is very hard to make an economic estimate of the tourist business: just think about the proceeds of restaurants, hard to break down into expenditure of tourists and residents, let alone the purchases of consumer goods, which can also include souvenirs for travellers.

Despite the above-mentioned problems, for the resident population another important statistical source is available (even if not specifically focused on tourism), that has not been sufficiently examined to analyze tourism: the current ISTAT survey on consumer expenditures of Italian households. This paper is devoted to study the potential information derivable by the comparison of the time series of tourism flows and time series of household expenditures on tourism accommodation facilities.

However, the matching of these two data sources allows the analysis of expenditure and tourism flows in Italy of the resident population. It is not a limitation of the study, because the evolution of domestic tourism of resident population has received increasing attention in the last years. In fact, the growth rate of domestic flows of residents has been gradually attenuating because of the increasing attraction of new foreign destinations, the decreasing attraction of the more traditional kinds of tourism, like costal or spa tourism, and, after 2007, because of the widespread economic crisis.

Therefore, the perspective of this paper aims not only at an evaluation of the information derived by gathering the two data sources. It aims also at a more comprehensive picture of the domestic tourism of the Italian population, in the years before the economic crisis started after 2007, through a time series analysis. As far as the tourism flows are concerned, we used monthly data on overnight stays. The number of overnight stays, even if is closed linked to the type of tourism (for example, the average of a summer stay at a seaside or mountain resort is decidedly longer than the duration of a visit in an art city), is generally preferred and, in this case, is consistent with the other measure used to quantify the economic dimension of tourism demand: expenditures on accommodation facilities by Italian households. These expenditure data are disseminated on a quarterly base but a simple monthly disaggregation has been operated by adjusting for monthly resident population and sample expansion weights.

The use of time series to examine and predict tourism phenomena is widespread both for scientific and practical purposes (Lim, 2006). The main advantage of analysing time series is to derive the trend pattern and the seasonal pattern. The trend pattern can highlight a possible and gradual change in tourist demand, the stage of the life cycle of destinations (Butler, 1980; Getz, 1990); while the seasonal pattern is very interesting for investigating the competitiveness and sustainability of tourist destinations (Saarinen, 2006).

## **1. Statistical sources on tourism in Italy.**

In order to examine the characteristics of tourism, in Italy we have several data sources. Taking into consideration only the official sources supplied by ISTAT, we simply focus our attention to those specifically concerning tourism:

- Arrivals and overnight stays in Italian accommodation establishments.
- Trips and holidays of residents, in Italy and abroad.
- Capacity of the accommodation establishments.

The first two surveys supply data (and the main information) on the dimension and characteristics of tourist demand as expressed, in the former survey, both by Italians and by foreigners; only by residents in Italy in the latter survey. The third survey concerns the characteristics of supply (number and type of accommodation establishments, number of beds, etc.).

The survey on the “Arrivals and overnight stays in Italian accommodation establishments” is a total survey that is conducted on a monthly basis. The observation unit is the accommodation facility (i.e.: hotel, campsite, rental flat, holiday farmhouse, youth hostel, holiday home, bed and breakfast facility, etc.). See: ISTATa website.

The survey on “Trips and holidays of residents, in Italy and abroad” is a sample survey collecting data on the trips made by residents (living in household) which include at least one overnight stay outside their home. The aim of the survey is to detect the number of trips and their main characteristics (destination, type of accommodation, means of transport, duration) as well as the socio-demographic characteristics of tourists. The survey, thus, provides a complete picture of the national tourism demand, quantifying the number of trips (and nights) both to Italy and abroad made for different purposes (business, leisure, religious reasons, health etc.). See: ISTATb website.

The survey on the “Capacity of the accommodation establishments” is a total survey that is conducted on a yearly basis. The units of measurement are accommodation facilities in Italy, divided into:

- hotels (classified in 5 categories) and residences;
- complementary facilities (campsites, holiday parks and other parks, rental flats for business stays, holiday farmhouses, youth hostels, holiday homes, bungalows and other accommodation);
- private rental flats (bed and breakfast facilities and other private accommodation).

The survey determines (for each municipality) the number of facilities, beds, rooms and bathrooms in hotels; the number of facilities and beds in the other accommodations. See: ISTATc web site.

The surveys presented here aim at evaluating quantitative aspects of tourism, linked to the nature and characteristics of demand and supply, failing however to examine its economic dimension. This failure has always existed in official surveys, despite the importance of and interest in the economic-social aspects of tourism, especially in countries like Italy, where tourism is very important. As mentioned in the preface, this essay plans to use other sources of official statistics to evaluate what cannot be expressly gained from the above-mentioned surveys.

## **2. The economic dimension of tourism.**

When we look at tourism, it is natural to think, in addition to the number of arrivals and overnight stays on one hand and tourist facilities on the other, about its impact on the economic system, both at a local and national level. Moreover, special attention is increasingly paid to other types of impacts, not just economic impacts, like those linked to sustainability and the so-called social tourism (Bucklay, 2012).

In order to introduce economic aspects as well, in this paper we have considered other ISTAT information and data sources which, even with different purposes and survey methods, can supply information on some aspects of tourism: national accounting and the survey on family consumption expenditure (in which some expenditure items are closely linked to tourism).

Within the national accounting system, the creation of a “Tourism Satellite Account” (TSA) is a tool for the representation of the tourist sector, considering the information on tourist demand and supply in a consistent and integrated way. The goal is to appraise the total economic dimension of tourist businesses and, as a consequence, to determine their impact on the economic system. This allows us both to evaluate the importance of the sector for the entire economy and to enable processing and comparisons at an international level. See: ISTATd website.

From the TSA 2012, focusing on 2010, precise information can be obtained, like for example, the added value of the tourist sector, equal to 82833 million euros (equal to approximately 6% of the Italian grand total), domestic tourist

consumption (of residents and non-residents) equal to 114016 million euros and the following breakdown of tourist expenditure: Italian tourists (44.2%), foreign tourists (25.7%) and secondary residences (30.1%).

The TSA is a precious source of information which however refers to just one year for now (with it being the first account of the sector and representing a prototype). In order to have a wider and more detailed picture time-wise, despite on a more limited number of tourism-related issues, we have used the “family consumption” survey made by ISTAT. It is a current sample survey which measures the expenditures of Italian families living in Italy for the purchase of consumer goods and services. In short, this source of information describes, analyses and interprets the spending behaviour of households. The spending component that is clearly connected to tourism is represented by three main items:

- accommodation expenditures;
- accommodation and full board expenditures;
- all-inclusive tour expenditures;

making a distinction between expenditures made in Italy and abroad.

This is an indirect picture of tourist expenditure, which, as is common knowledge, also includes other items and which, as you can infer from the TSA, also extends to fields which are not directly linked to tourist businesses (purchase of non-tourist goods and services, which are estimated at 23.2% - see: ISTATd website.). However, time continuity of the series and its representativeness of just one significant component of tourist expenditure of Italian families allow us to use it for a comparison, that we deem interesting, with data from the specific statistical measurements on the tourist sector.

The survey on family consumption is a two-stage sample survey (municipalities and families) with stratification of the first-stage units, which measures the expenses incurred by families living in Italy to purchase consumer goods and services. Since this survey represents the most important source of information to analyse families spending behaviours, we believe it should be taken into consideration because it represents an important part of tourist demand. See ISTATe website.

Every year, ISTAT publishes consumption data, even if it uses a quarterly sample (and makes inference to the universe) to prepare the National Accounting aggregate data. Actually, the enumeration of tourist expenditure occurs on a monthly basis (every month approximately one third of the sample is used, which is significant at a quarterly level). In fact, the family is asked if “in the past month at least one of the family members has incurred holiday expenditures” and, if the answer is yes, the next question is:

“how much was spent on:

- trips or all-inclusive organized tours (including school trips);
- full board, half board (in hotels, residences, campsites etc.);
- overnight stay (in hotels, residences, campsites, private homes etc.).”

The use of data on family consumption for expenditures which are remarkably seasonal can call to mind the so-called “zero spending” problem, typical of infrequent consumption or (Cragg, 1971), like what we are reviewing here, consumption showing different frequency in different months. However, as described above, the measurement of expenditures for tourist activities refers to “expenditures made during the month prior to the interview” and therefore zero spending could be due (in addition to an actual zero spending) to the so-called memory effect (Deaton and Irish, 1984) which, on Italian data, was studied for example by Grassini and Viviani (2000). Undoubtedly, however, there may be a time lapse between the holiday expenditure and the actual holiday. In fact, with new web communication media being widespread, such a time lapse can even exceed one month.

### **3. Tourist flows and economic dimension: a comparison.**

In order to evaluate information on tourist expenditures in Italy of residents, we have decided to compare data of expenditures for tourist consumption, resulting from the survey on family consumption currently conducted by ISTAT (as mentioned above), and those concerning overnight stays at hotel and non-hotel facilities. Table 1 summarizes the main differences in data quality of these two statistical sources.

Table 1 – Some characteristics of the surveys used for comparison.

	Data quality aspects	Measurement and publication of data		
	ACCURACY	COLLECTION TIME REFERENCE	PUBLICATION TIME REFERENCE	STATISTICAL UNITS
Nights spent	LOW LEVEL OF ERROR IN THE TIME FRAME AND IN THE CALCULATION OF OVERNIGHT STAYS	DAY	MONTH	CLIENTS OF ACCOMMODATION FACILITIES
Tourism expenditure	POTENTIAL ERRORS: 1) ON THE AMOUNT OF THE EXPENDITURE. 2) DUE TO THE DIFFERENCE BETWEEN THE TIME WHEN THE EXPENDITURE IS MADE AND THE TIME WHEN THE HOLIDAY IS MADE BECAUSE OF: - TELESCOPING ERROR. - ERRORS DUE TO NEW MODES OF TOURIST SERVICE BOOKING (ONLINE BOOKING, ETC.).	MONTH	QUARTER (YEAR)	TOURISTS (WITH AT LEAST ONE OVERNIGHT STAY)

The expenditure series was first referred to a monthly basis and then deflated (1997 base prices) to eliminate price change effect. In the case of tourism it is very important to have monthly time series available. We then proceeded to make a correction, required by the different number of families participating in the single monthly surveys, compared to a constant weighting ratio of the sample to the universe per quarter. In short, for each quarter, given the consumption series (weighted to the universe)  $Y_{ij}$  where  $i$ =year and  $j$ =1, 2, 3 (month) and the population consumption (weighted to the universe)  $p_{ij}$ , the correct monthly data  $Y'_{ij}$  is:

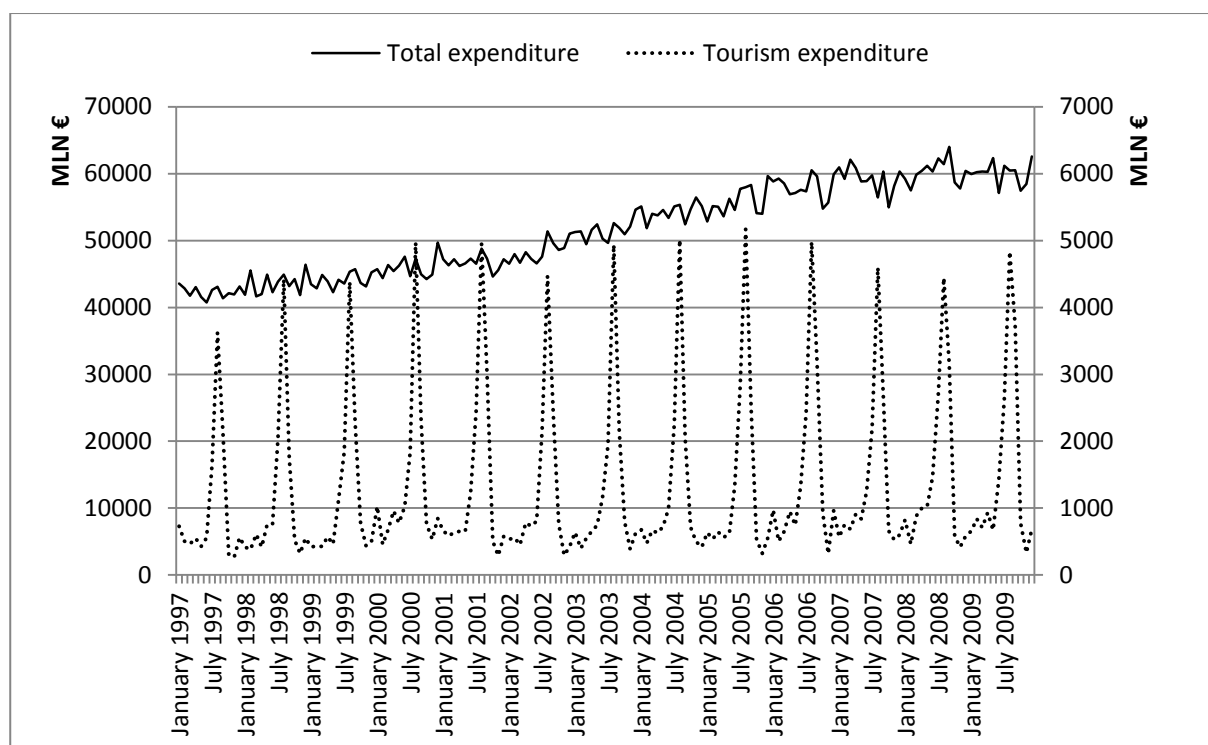
$$Y'_{ij} = Y_{ij} \frac{\bar{p}_i}{p_{ij}}$$

where  $\bar{p}_i = \frac{1}{3} \sum_{k=1}^3 p_{ik}$  is the monthly average of the population during the quarter.

The same process was applied to the total family expenditure data to understand if, as expected, tourist expenditure would show its typical seasonal peaks.

In figure 1 we can observe the trend, at current prices, of tourist consumption, measured through the relevant expenditure, compared to total consumption (the chart is on scale to consider the different magnitude). Please note the distinctly seasonal trend of tourist expenditure, which even shows a poor evolution, compared to that of total expenditure.

Figure 1 - Trend of tourist consumption in Italy and abroad and of total consumption of residents (values at current prices - processing on ISTAT data)



In Figures 2 and 3 we can observe the results obtained by means of the deflation made on monthly data the tourist consumption series using the price index of hotels and other tourist facilities. As you can see (Figure 2), by comparing the current-price series with the constant-price series, the deflation effect is more marked during high-season periods (summer months). In fact, the price index used shows a seasonal pattern unlike the common price index for the entire national community, as shown in Figure 3. In the latter figure you can see that, starting from 2000 and more markedly from 2003, a greater seasonality was more visible in the trend of prices of hotels and other accommodation facilities. Since the deflated data on expenditures are derived by using monthly price indexes, it is reasonable to assume that a large part of price changes due to price dynamics have been eliminated. Anyway, some same-year price variation still remains even because the price index refers to the price of hotels while other types of accommodation facilities operate that may have different price policies. And specifically, in recent years there has been a major restructuring of the hotel industry with a remarkable decreasing of 1- and 2-star hotels and a general price contraction. However the pattern is systematic for each year in the series.

Figure 2 – Comparison between tourist consumption in Italy at current prices and at constant prices  
(processing on ISTAT data)

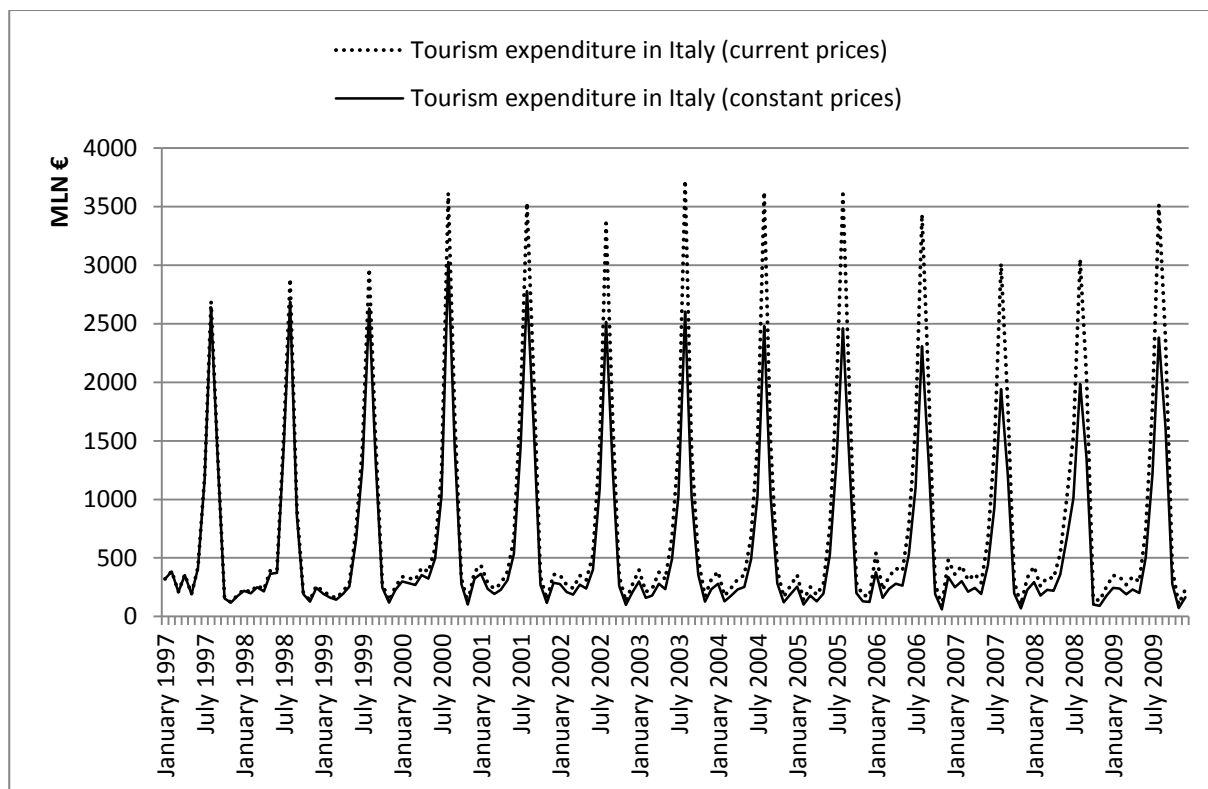
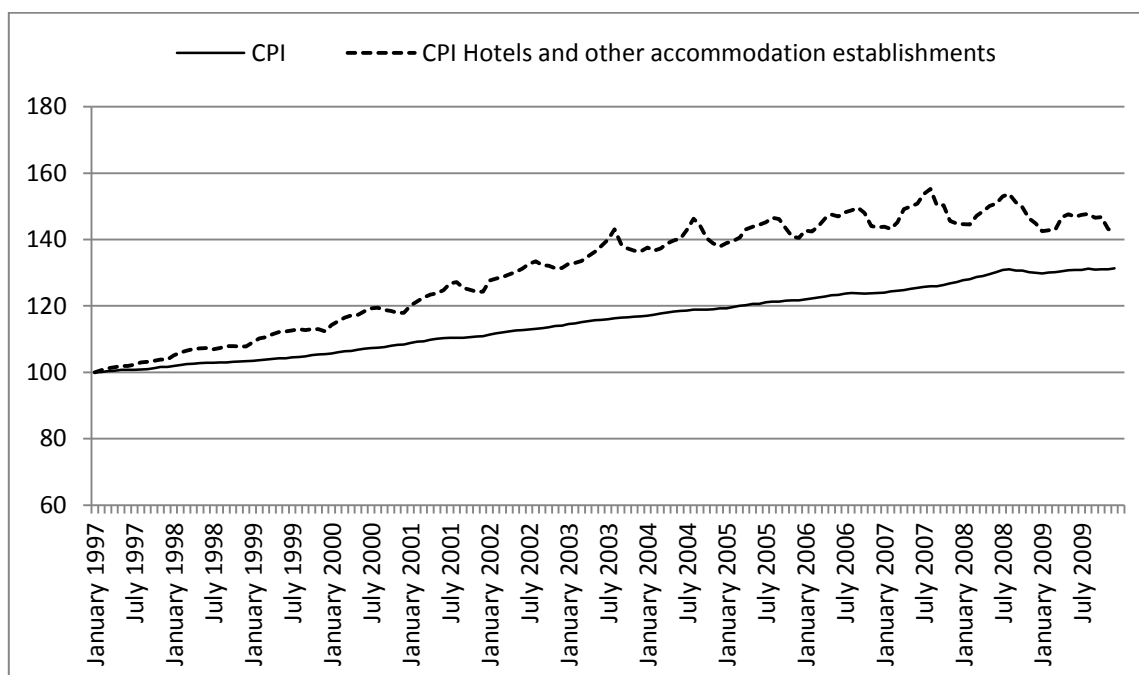
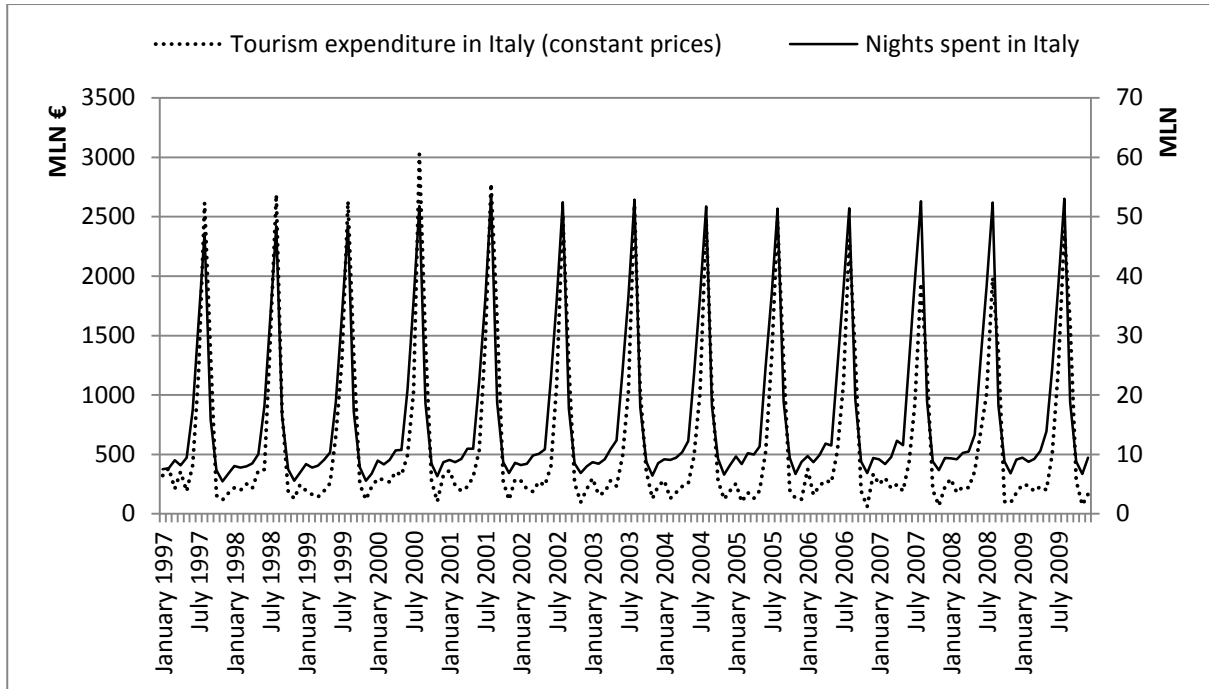


Figure 3 – Comparison between tourist consumption in Italy at current prices and at constant prices  
(processing on ISTAT data)



The most interesting comparison is the one in in Figure 4, between two time series: deflated tourist expenditures and monthly number of overnight stays. A first and more general evaluation concerns the remarkable conformity in low- and high-season peaks; the consumption series, unlike the overnight stays series, does not clearly show the fluctuation of the Easter period.

Figure 4 – Comparison between consumption at constant prices and overnight stays (Nights spent) in hotels and in other accommodation facilities (processing on ISTAT data)



In the presence of a strong seasonality, which is also typical of tourism-connected phenomena, in order to gather useful information from comparing the two series, it is however necessary to break down the two series to highlight their evolving components: the trend cycle and seasonality.

So, we assumed that the time series can be described by the following model:

$$y_t = w_t + z_t = \sum_{i=1}^n \beta_i x_{it} + z_t$$

and we utilized the TRAMO SEATS procedure<sup>1</sup> to seasonally adjust the two time series, using ARIMA model-based signal extraction techniques.

TRAMO analyzes and corrects the component  $w_t$  and it is designed to eliminate any deterministic effects (working days, leap year, moving holidays, outliers, etc.), described by the  $x$  non stochastic variables; moreover, TRAMO identifies and estimates the ARIMA model which describes the time series purified from the deterministic effects. The linearized series  $z_t$  results from the interaction of three unobservable factors: trend-cycle, seasonality, irregular component. SEATS works on the component  $z_t$  and, starting from the model derived from the TRAMO step, finally obtains the decomposition of the series through spectral analysis. The specification search starts with the Airline model. Also a special Holiday regressor variable is introduced but without useful results. It is a binary variable that assumes 1 in April, May and June if, respectively, 25<sup>th</sup> April, 1<sup>st</sup> May, 2<sup>nd</sup> June (public holidays) occurs in Monday, Thursday and Friday. The results of the application are in table 2.

The Airline model estimated on the nights spent series exhibits the significant effects of leap year (LP), working day (WD), Easter (EE) and identifies one outlier, but the MA1 estimate is close to one, revealing a probably over-differencing. Moreover, all tests on the residuals are significant. The alternative specification is the Airline model with the Holiday variable which is significant together with the other deterministic effects. The MA1 estimate is  $-0.8032$  but the normality tests are not satisfied. The automatic procedure identifies an Arima(0,0,0)(0,1,0)<sub>12</sub> with the TD, LY, EE effects and four outliers. It means that the data, purified from the deterministic effects and outliers, exhibit a time pattern characterized by a phase of stationarity with an underlying inertia due to a huge seasonality.

<sup>1</sup> TRAMO (*Time series Regression with Arima noise, Missing observations, and Outliers*) and SEATS (*Signal Extraction in Arima Time Series*) are linked programs developed by Victor Gomez and Agustin Maravall (Gomez and Maravall, 2001a, 2001b). For an example of use of this procedure in time series of arrivals and nights spent see: Giusti and Grassini (2009).



The Airline model estimated on the expenditure series produces acceptable results. TD, LY, EE and Holiday effects are not significant, probably because the series is derived as a decomposition of the quarterly data (see paragraph 3).

Table 2 - Results of the TRAMO SEATS procedure

<b>Nights spent - TRAMO Airline model</b>	<b>Nights spent – TRAMO Automatic procedure</b>	<b>Expenditures – TRAMO Airline model</b>
LOG transform	LOG transform	LOG transform
LY significant	LY effect	LY not significant
WD significant	WD effect	WD not significant
EE significant	EE effect	EE not significant
Outliers	Outliers	Outliers
LS (1 2000)	LS (1 2000) , TC (12 2000), TC (5 2003), AO (11 2007)	AO (10 2008)
ARIMA model estimates	Identified ARIMA model	ARIMA model estimates
MA1= -0.9866	(0,0,0)(0,1,0)	MA1 = -0.9077
MA12= -0.3281		MA12= -0.8470
BIC = -6.328	BIC = -6.446	BIC = -2.756
N = 1.005 (0.606)	N = 1.184 (0.553)	N = 1.665 (0.435)
Q <sub>24</sub> = 39.39 (0.013)	Q <sub>24</sub> = 32.82 (0.108)	Q <sub>24</sub> = 16.07 (0.812)
Q <sub>24</sub> = 19.15 (0.636)	Q <sub>24</sub> = 27.23 (0.294)	Q <sub>24</sub> = 19.38 (0.622)
<b>SEATS</b>	<b>SEATS</b>	<b>SEATS</b>
N = 5.703 (0.058)	N = 0.7434 (0.690)	N = 0.547 (0.394)
Q <sub>24</sub> = 37.10 (0.023)	Q <sub>24</sub> = 26.24 (0.341)	Q <sub>24</sub> = 20.96 (0.523)
Q <sub>24</sub> = 20.49 (0.552)	Q <sub>24</sub> = 30.47 (0.170)	Q <sub>24</sub> = 24.27 (0.333)

**Legend.** LY: leap year; WD: working day; EE: Eastern effect. BIC: Bayesian information criterion; N: Bowman-Shenton test for normality (it is asymptotically distributed as a  $\chi^2_2$ ). Q<sub>24</sub>: Ljung-Box\_Pierce test for residual autocorrelation using the first 24 autocorrelations (it is asymptotically distributed as a  $\chi^2_h$  with  $h$  degrees of freedom depending on the model; 22 for the Airline model); Q<sub>24</sub> is the test for linearity, analogous to the previous test, but computed on the squared residuals. p-values within brackets. Outliers: LS: line shift, AO: additive outlier, TC: transitory change.

For the series nights spent, seasonal adjusted data are available from ISTAT. They are produced by the TRAMO-SEATS procedure. However those data are derived from a longer series than the one here used and therefore we have preferred to carry out an *ad hoc* analysis in order to maintain consistency between the two series. Anyway, the discrepancy with the ISTAT seasonal adjusted data for the period Jan 1997 – Dec 2009 is negligible (MAPE index 1.4%).

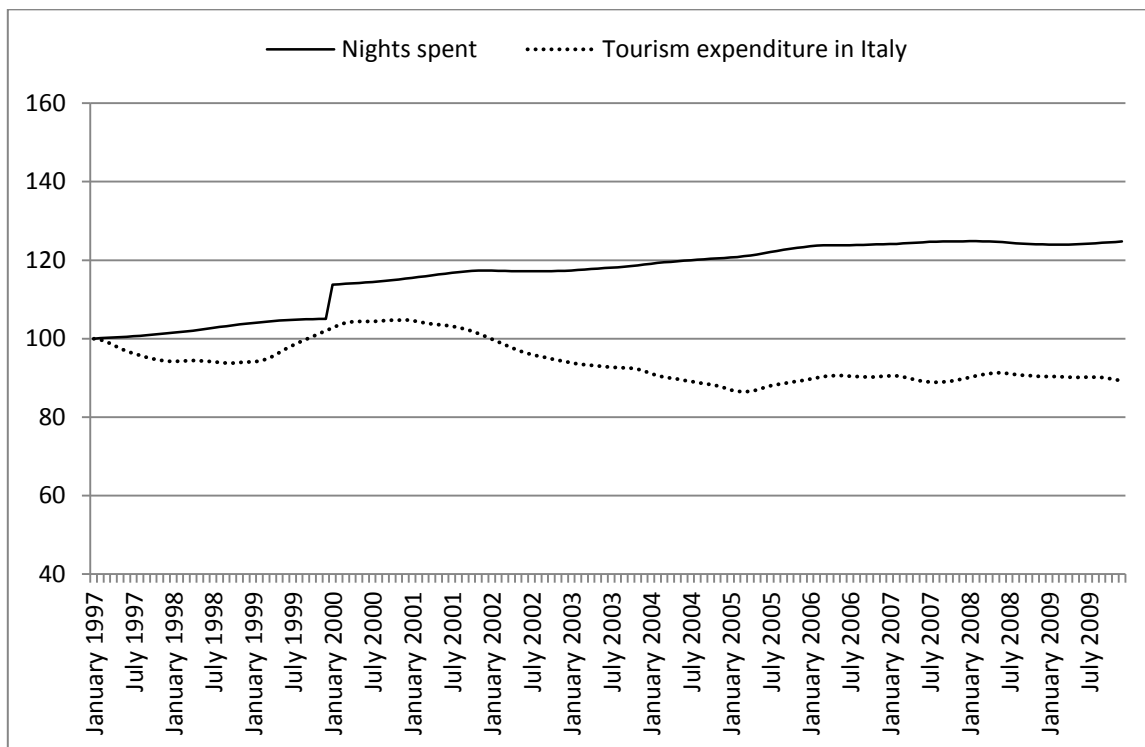
Figure 5 shows the estimated trend-cycles that exhibit slightly different patterns: slowly increasing for nights spent, slowly decreasing for expenditures. As far as the line shift (between Dec 1999 and Jan 2000) of the nights spent series is concerned, it can be observed that:

- the tourism flows of residents always are characterized by larger figures in Jan than in Dec;
- the original series exhibits a +33% rise in the number of nights spent between Dec 1999-Jan 2000 that may be attributed also to the events related to the 2000 Jubilee<sup>2</sup>; anyway, this fact cannot explain the line shift of the whole series for the subsequent years;
- some changes occurred in the data collection procedure: elimination of a section of the questionnaire (the computation of summary data) and for the first time, an electronic format of the questionnaire was delivered to the local statistical offices.

Anyway, looking at the post 2000 series, the change between Dec 2000 and Dec 2009 was +8% for nights spent and -15% for expenditures, but expenditure series remained substantially constant since 2005.

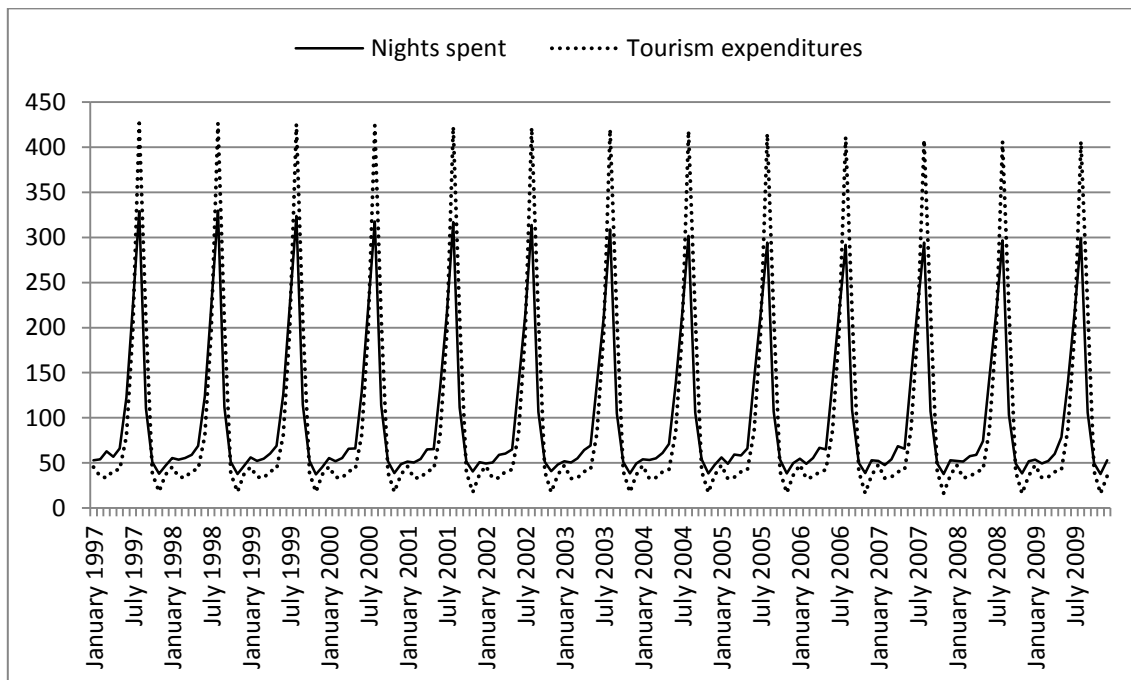
<sup>2</sup> The Jubilee was held from Christmas Eve (December 24), 1999 to Epiphany (January 6), 2001.

Figure 5 – Estimated trend-cycle. Index numbers (base = Jan 1997)



Moreover, Figure 6 describes the seasonal pattern of the two series.

Figure 6 - Seasonal coefficients (%) of nights spent and expenditures of residents at constant prices

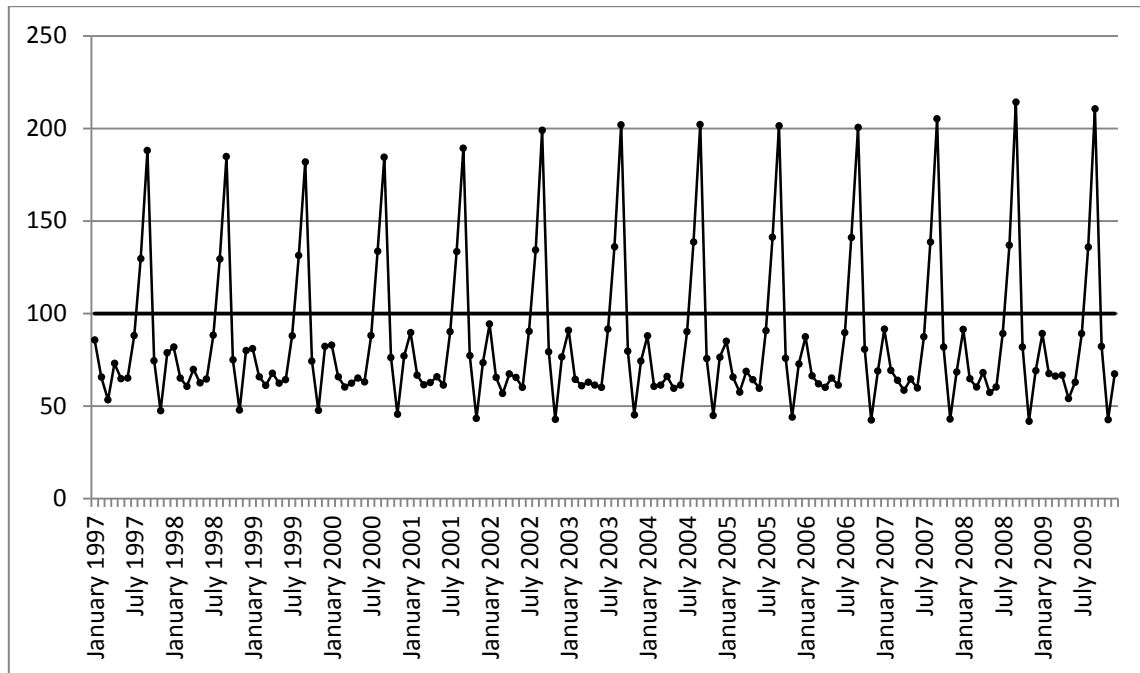


The comparison of the two patterns can be better appreciated by a sequence of data processing (figures 7-8); the first one is represented by the computation, for each month, of the following coefficient:

$$EXNI = 100 \frac{\text{seasonal coefficient expenditure series}}{\text{seasonal coefficient night spent series}}$$

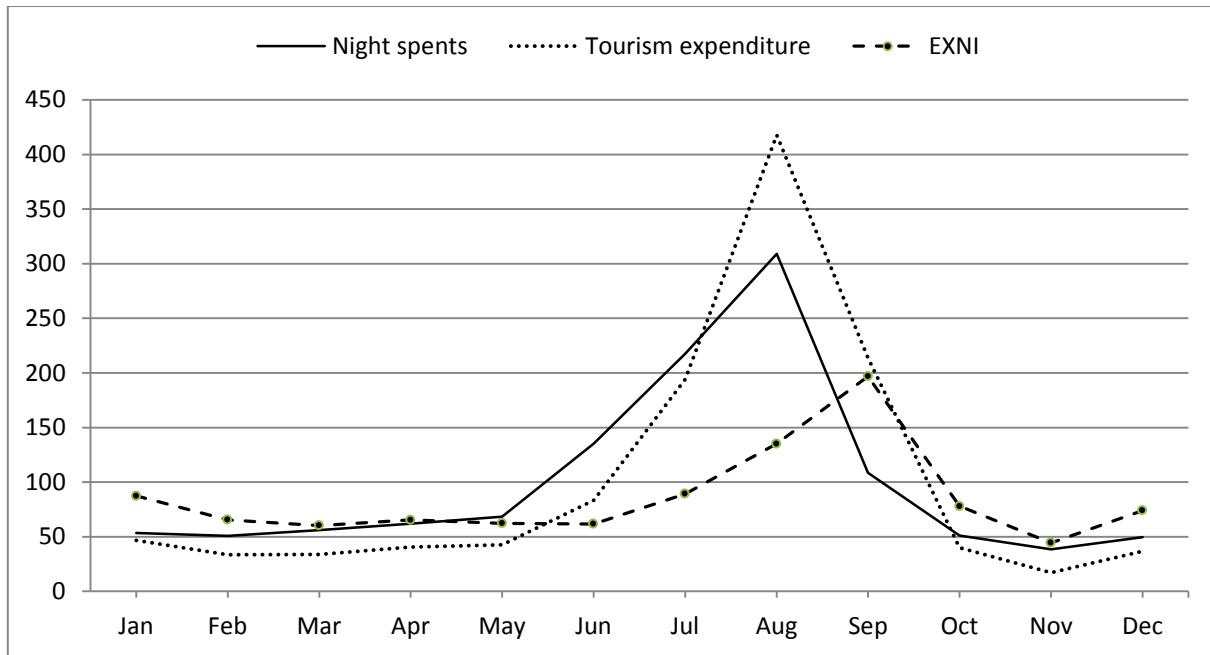
The results, presented in Figure 7, show a constant seasonality pattern, with an appreciable enlargement of the fluctuations.

Figure 7 - Ratio of seasonal coefficient of expenditures at constant prices on seasonal coefficient of nights spent (EXNI)



But we found more interesting to look at the average monthly seasonal cycle of nights spent, expenditures and EXNI. Figure 8 shows that the seasonal coefficient of the nights spent series always are lower than the expenditure ones with the exception of August and September. The typical seasonal pattern of EXNI exhibits a rapid increasing in August and a slower decreasing in September: revealing an inertia after the high season. In any case, the use of EXNI indicator is interesting and deserves to be deepened.

Figure 8 - Average seasonal cycle of nights spent and expenditures and related EXNI cycle  
(% values)



Some reports of the Osservatorio Nazionale sul Turismo (ONT) like, for example ONT (2008), found significant flows of Italian tourist during September. They are concerned with coastal holidays in the South of Italy and with cultural holidays in the most classical destinations (Tuscany, Lazio, Emilia Romagna). The apparent price rigidity expressed by the EXNI index can be attributed to an effective price effect determined by a particular characterization of the mix of tourism activities. In fact, even if in Southern Italy prices are more favorable than in the rest of the country, September can be considered a high season. In order to learn more about these aspects it would be necessary to proceed to a territorial analysis, possibly as detailed as Giusti and Grassini's (2008).

## CONCLUSIONS

In this essay, we have considered some family expenditure items as a unit of measurement, albeit approximate, of tourist consumption of residents, to be added to traditional tourism indicators; next, we have compared this unit of measurement with the more comparable traditional tourism indicator: the number of overnight stays in accommodation facilities (overnight stays) to find analogies and differences in terms of information content. From comparing the two series, some findings have emerged:

- Italian families show a more reduced spending capacity for tourist services over time;
- following this spending reduction we observe a fairly positive dynamics in terms of number of overnight stays;
- the strong seasonal component of both phenomena tends to absorb most variability of the two series concerned; as we know (Baum T, Lundtorp S., 2001), the excess seasonal concentration of tourism is one of the main problems of the sector and its desirable mitigation is an important goal (SooCheong, 2004).

This latter finding requires an in-depth analysis of the two seasonal profiles; in fact, for tourist expenditures the traditional importance of August, in Italy, is even greater than the one observed for overnight stays. In this regard, a first contribution from this essay is represented by the introduction of the EXNI indicator, consisting of the relationship between the two average coefficients of seasonality. In this case, unlike the indexes of the other two series, which feature a higher seasonality value in August, the peak is in September, when the seasonality expenditure index is twice the overnight stays index. A delay is noticeable as compared to the other series, as we have seen in Figure 8. This result, which deserves in-depth examination, indicates that in September there is a different mix of forms of tourism, characterized by very diversified levels of expenditures. In any case, this situation draws the attention to the tourist potentials which can be accomplished in September. Seasonality in tourism represents both a constraint and an opportunity: the comparison between these two series suggests that the component under review shows different findings when considering different magnitudes, even if they refer to the same phenomenon (in our case tourist demand).

Compared to the first two points mentioned above (a and b) we observe that, even if in Italy tourist demand is characterized by a mild increase in quantity (overnight stays), a shrinkage in the relevant expenditure is crystal clear. In short, this seems to mean that demand can remain quite lively even in the presence of significant cost control.

We believe that using an official statistical source that does not directly refer to tourism, but that is connected to it on the basis of the classification of family expenditures, enhances the possibility of analysing tourism. This could also be helpful to formulate solutions aimed at reducing the seasonal component. In prospect, by adding more sources, we could try to define a model of tourist demand of residents, also considering the characteristics of expenditure.

## References.

- Baum T, Lundtorp S. (Eds.) (2001), *Seasonality in Tourism*, Oxford, Elsevier Science.
- Bucklay R. (2012), Sustainable Tourism: Research and Reality, *Annals of Tourism Research*, **39**, pp. 528-546.
- Butler R. (1980), The concept of a Tourism Area Cycle of Evolution: Implications for Management of Resources, *Canadian Geographer*, **14**, 5-12.
- Cragg J.G. (1971) Some statistical models for limited dependent variable with applications to the demand for durable goods, *Econometrica*, **39**, 829-844.
- Deaton A.S., Irish M. (1984), Statistical Models for Zero Expenditures in Household Budgets, *Journal of Public Economy*, **23**, 59-80.
- Dwyer L., Forsyth P. (Eds.) (2006), *International Handbook on the Economics of Tourism*, Boston, Edward Elgar.
- Getz D (1992), Tourism Planning and Destination Life Cycle, *Annals of Tourism Research*, **19**, pp. 752-770.
- Giusti A. Grassini L. (2009), Tourism seasonality in Firenze and in Italy, in: Ferrari G., Mondéjar Jiménez J., Mondéjar Jiménez J. A., Vargas Vargas M. (eds.) *Principales tendencias de investigación en turismo*, Oviedo, Septem Ediciones.
- Giusti A. Grassini L. (2008), Cluster analysis of census data using the symbolic data approach, in: *Advances in Data Analysis and Classification*, **2**, pp. 163-176.
- Gomez V., Maravall A. (2001a). Automatic Modelling Methods for Univariate Series, in: Peña D., Tiao G.C., Tsay R.S. (eds.) *A Course in Time Series Analysis*, New York, Wiley.
- Gomez V., Maravall A. (2001b). Seasonal Adjustment and Signal Extraction in Arima Time Series, in: Peña D., Tiao G.C., Tsay R.S. (eds.) *A Course in Time Series Analysis*, New York, Wiley.
- Grassini L., Viviani A. (2000). Modelli tobit e p-tobit nello studio del comportamento di spesa in presenza di errori di registrazione, *Statistica applicata*, **12**, 273-288.
- Lim C. (2006), A survey of tourism demand modelling practice: issues and implications, in: Dwyer L., Forsyth P. (Eds.) (2006).
- ONT (2008), Indagine quantitative sui comportamenti turistici degli italiani, Roma, ONT, (available online at [www.ont.it](http://www.ont.it)).
- Saarinén J. (2006), Traditions of sustainability in tourism studies, in: *Annals of Tourism Research*, **33**, pp. 1121-1140.
- SooCheong (Shawn) J. (2004), Mitigating Tourism Seasonality. A Quantitative Approach, *Annals of Tourism Research*, **31**, pp. 819-836.

## Web sites.

ISTATa <http://www.istat.it/it/archivio/4014>

ISTATb	<a href="http://www.istat.it/en/archive/53676">http://www.istat.it/en/archive/53676</a>
ISTATc	<a href="http://www.istat.it/it/archivio/14517">http://www.istat.it/it/archivio/14517</a>
ISTATd	<a href="http://www.istat.it/en/archive/71012">http://www.istat.it/en/archive/71012</a>
ISTATe	<a href="http://www.istat.it/en/archive/32560">http://www.istat.it/en/archive/32560</a>